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When choosing a college, the student must (1) know his own strengths, limitations, resources, and interests, (2) be able to find a college compatible with his various needs and wishes, and (3) know how to compare the likely ones. Since all three problems are difficult to solve, many poor choices are made by both the students and the colleges. To get the right students and colleges together, an automated information system was considered. It led to the development of the College Suggestor, defined as a data retrieval device for use as a guide to college choice. The system used 1931 institutions and 213 characteristics (in 12 categories: location, size, control, prerequisites, admission information, costs, financial aid, program, student body, faculty, degree majors, occupational programs), giving a total array of 460,000 information pieces and representing American higher education as of 1966. The characteristics were defined by a panel of experts (who included in their definitions opinions solicited from students and prospective students); descriptive data came from Office of Education files and from the colleges themselves. Combined use of computers, graphics, and printing made it possible to produce the device at low cost. Prototypes were manufactures in 1967 for controlled field trial in 1967-68. (Reports on the field trials are forthcoming.) An example of student use of the Suggestor is given. (HH)

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# Data Retrieval Systems and College Selections*

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It doesn't take the Delphi technique to reach consensus on the dimensions of the information dilemma each high school student faces when he knows he wants to go to college but is unsure where he should apply for admission. First, he needs to know about himself: what his strengths, limitations, resources, and interests are. What does he bring with him to the college experience? Second, he needs to learn as much as he can about the characteristics of the colleges that are reasonably compatible with his individual profile. What colleges can help him realize his objectives? Third, he needs to have legitimate ways of comparing and contrasting the compatible colleges so that a decision may be reached on those few to which he is going to make application. Which colleges afford him the most favorable odds for success, however success may be defined?

On each of these three counts, of course, the typical student indeed does face a dilemma for (a) learning enough about oneself to make a major decision at age seventeen is no cinch--even with good counseling, (b) forthright descriptions of colleges sufficient to the task of knowing a college are not easy to come by, one even may reasonably ask if they indeed exist, and (c) the task of matching individual proclivities to potential college opportunities has within it an unmistakeable "needle in the haystack" component that is close to overwhelming to student, counselor, and parent alike.

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In working through these difficulties, students and their parents now turn for help in all directions at once, (witness the Education section of Time for January 10, 1969), and the counselors are looking for help too. I believe it could be demonstrated that significant numbers of college-able students give up or are given up on in the mad dash to the threshold of the college door, and that many of those who make poor choices of college give up just inside the doorway. Among those who don't manage to take in enough of the right kinds of information to negotiate the maze called college admission, one may find both failure of self-fulfillment and waste in valuable human resources. It was the motivation to improve this condition that brought about the development upon which Dr. Mathis and I shall report.

One way of dealing with the college choosing problem is to employ information systems to get students and colleges together. There are over two thousand junior colleges, colleges and universities in the United States and at least several hundred different ways by which to characterize them. So an information system that would address college choosing in the 1970's would contain something in the order of one half million pieces of information--very small as information systems go.

This was the approach taken in the development of the College Suggestor--* an information system and device for use as a guide to college choice. The system comprises a universe of 1,931 junior colleges, colleges and universities among the 2,160 that were in the 1965 Office of Education directory, and identifies with each institution the characteristics that are present there among the 213 college characteristics built into the system. So the array totals 460,000 pieces of information.

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* Refer to page 5.

College characterizations were organized into twelve classifications:

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|---|---|
| Location | 13 |
| Size | 5 |
| Control | 6 |
| Prerequisites | 9 |
| Admission Information | 14 |
| Costs | 14 |
| Financial Aid | 10 |
| Program | 27 |
| Student Body | 39 |
| Faculty | 3 |
| Degree Majors | 57 |
| Occupational Programs | 16 |

Specifics on college characteristics to be included and their explicit definitions were settled upon by a panel of secondary school college counselors, college admissions officers and higher education research specialists. Counsel also was sought from that oft-forgotten group of consultants on higher education research design--college students and potential college students. The descriptive information came from two sources: existing Office of Education data files and a questionnaire administered to the colleges directly. The composite information was an accurate representation of American higher education as it was in early 1966.

By imaginative use of computers, graphics, and printing, it was feasible even at that time to convert the information system into graphics, and to print it in quantity in the form of inexpensive information retrieval devices. Several technologies were used. Inverted filing by computer made it possible to "flip" unit records into "term" records. Photon type-setting made it possible to convert the output from computers into input for printing presses. High speed printing with multi-colored ink on plastic made it possible to mass produce the information device at low unit cost as an interactive information query and retrieval system.

Several hundred prototype devices were manufactured in 1967 to be exposed to field test under controlled conditions during academic year 1967-68. Dr. B. Claude Mathis will report on the field trials directly. But before he does, let me show you how a student might use the College Suggestor in dealing with his college choice dilemma.

The College Suggestor retrieval device is a box containing over 200 plastic cards printed in two colors, one card for each characteristic. On every card a given college has the same code number at the same position. There is also a code book to list the characteristics for which there are cards and to identify the colleges that go with the codes.

The College Suggestor works on the principle of optical coincidence, sometimes referred to as peek-a-boo. Let's say that I am a practical sort of guy, and would feel more comfortable with students who are bent on preparing for a specific carreer (111). It would suit me also if the program of the college which I attend is pointed toward occupational preparation (98). I intend to major in a trade or industrial field (203), and to take a Bachelor's Degree in a technological institution (77). Where would I fit in?

To ask the College Suggestor this question, I'll place cards 111, 98, 203, and 77 on the light stand, and look for spots of white light. There is only one, and it is number 1884. It turns out to be Letourneau College, Longview, Texas.

I could have put any of 209 other college characterizations into my query and would have come up with only those colleges that combine the characteristics about which I had inquired. I can change my query to the system until I am satisfied that the colleges it suggests are the ones for me. I

have a way of thinking introspectively about myself and my future, of digging out rather forthright descriptions of the colleges that interest me, and of matching my proclivities to a broad array of college opportunities. I am helped in organizing my own thinking about college. I am helped in identifying colleges I've not even thought of before. College searching has almost become a fun game. I might even find that needle in the haystack.

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* The College Suggestor--A Data Retrieval Device for Use as a Guide to College Choice

This project was undertaken at the express request of the Office of Education, Department of Health, Education, and Welfare, and was sponsored by its Bureau of Research. The developmental phase was OE Project No. X-014, the field validation phase was identified as Project No. 6-1889. The work was completed under the "Public Domain" policy at the Office of Education and is filed with Educational Resources Information Center (ERIC).

Northwestern University was prime contractor, Dr. B. Claude Mathis, Principal Investigator. Educational Testing Service was sub-contractor for the development, Dr. Wesley W. Walton, Project Director. Mr. Roger D. Marshall, Inventor, of Arlington, Virginia, was technical consultant, holding pre-existing patents embodied in the system.